QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Existence in the Tissues of Animals of a Substance closely resembling Quinia.*—Dr. Henry Bence Jones, in a lecture delivered March 23d, 1866, before the Royal Institution of Great Britain, announced his discovery everywhere in the tissues of animals, of a substance closely resembling quinia. He has proved it to exist in living as well as in dead tissues. He terms it animal quinoidine. We have not space for the details of his experiments, which are published in the *Medical Times and Gaz.*, Aug. 18th, 1866, but we may say that they appear to have been conducted with care and devised with great ingenuity. Dr. Jones has also shown that when sulphate of quinia is given to animals it rapidly passes from the blood into all the tissues, even into the crystalline lens.

"Thus, then," he says, "the quinia goes everywhere; and wherever it goes it meets with the natural fluorescent substance like quinine which most probably is constantly forming and undergoing oxidation. The incoming quinine causes a temporary excess of quinine in the textures. Probably it causes a stoppage of the fresh formation of quinine from albumen; a temporary arrest of the changes going on; a transfer of action probably to the quinine introduced. so that with large doses deafness and great prostration and almost imperceptible pulse are produced in man. whilst in guinea-pigs death even is caused by the extreme prostration. In small doses, quinine, probably like alcohol, gives an immediate stimulus when the first chemical action takes place; but soon the quinine retards the chemical changes in the nitrogenous substances. just as alcohol, by its secondary action, retards the chemical changes in the hydrocarbons in the different textures.

"Possibly the increased resistance to changes in the textures and in the blood produced by excessive doses of quinine or alcohol, is analogous to that state well known to medical men under the very indefinite and probably incorrect name of uræmia.

"From these experiments two hopeful prospects of possible discovery arise—1st, as to the explanation of the cause and cure of ague; 2d, as to the treatment of diseases in parts of the body external to the bloodvessels.

"1. Assume that a substance like quinine exists, during health, in the textures, can its rapid destruction and removal through the action of marsh miasm give rise to ague? Does quinine cure ague by furnishing a substance which retards the changes which go on in the textures? and in the well-known property of arsenic to preserve organic substances have we also the explanation of its power in curing ague?

"2. If the chemical circulation can carry alkaloids even into the non-vascular tissues, is it not reasonable to suppose that medicines pass through the blood and act on the textures; and is it not most probable that they take part in every chemical change that occurs outside the bloodvessels, as well as in the blood itself? Still further, may we not expect that among the multitude of new substances which synthetical chemistry is now constantly forming, some medicines may be discovered which may not only have power to control the excessive chemical changes of the textures in fevers and inflammations, but may be able to remove the products of insufficient chemical action even in those diseases which affect the non-vascular textures, as, for example, in cataract and in gout?"

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2. *On the Heat of Fluidity, or Latent Heat of Animal Bodies.*—Dr. B. W. RICHARDSON gave to the British Medical Association, at its late meeting, a brief description of his recent original researches on this subject. These researches were entirely new, and opened up a wide field of thought in the science and practice of medicine. The author had been led to them by the observation that when a part of the body was frozen, at the moment of freezing there was always a rise in temperature, indicating the evolution of heat previously insensible. This fact led him to determine the heat of fluidity of blood, fat, albumen, gelatine, brain matter, blood-corpuscles, and other structures. Having briefly entered into details on these points, the author illustrated his subject by referring to various physiological phenomena, dwelling particularly on the function of the blood-corpuscles. These, he said, played a part previously unrecognized. They were the bearers of heat by rendering heat liberated in the pulmonic circuit latent, and conveying it to the tissues to be there redelivered in the process of condensation. Fatty substances, in like manner, rendered heat latent in the pulmonic circuit, and conveyed it to the extreme parts.

In a paper published in the *Med. Times and Gazette*, Aug. 4, we find some further details of Dr. Richardson's researches. He states "that each part of the body that has the property of being transferred from the solid to the liquid, and conversely from the liquid to the solid condition, possesses a given capacity for latent heat, or heat of fluidity, and that the process by which the body is heated from the combustion going on in the lungs is mainly carried on by the agency of heat rendered latent. Thus fatty matter taken in the liquid form into the stomach, and conveyed unconsumed into the extreme parts of the circulation, in being deposited there yields up an equivalent of not less than 162° of heat. Thus water, which, as the grand menstruum of the solids, must be protected by the saline substances and the albumen that it cannot be solidified even locally at any temperature above 16° Fahrenheit. Thus, and lastly for the present occasion, by their capacity for taking up the heat of fluidity and for yielding that heat up again, the blood-corpuscles become the great carriers of that caloric of the body by which all the soft parts hold and maintain their mobility and physical activity.

"But in order that the blood-corpuscles should be subjected to the influence of living combustion in the lungs, they must be brought over the pulmonic circuit in proper mechanical suspension—in other words, in a state of proper distribution; and this obtains so long as they are borne in the fibrin of the liquor sanguinis, the fibrin itself being diffused equally through the homogeneous fluid of water, saline matter, and albumen, which we call serum. The moment, therefore, there is separation of water from albumen, the moment the balance of water, albumen, fibrin, and blood-corpuscles is disturbed by the separation and abstraction of water, that moment the blood-corpuscles cease to be brought correctly to the lungs to fix caloric. As a result, there is a reduction in the amount of the caloric of fluidity that should be conveyed to the tissues, and then every ounce of water, beyond what is natural, that is conveyed from the organism carries away so much caloric at the expense of so much tissue. In fact, if it were not for the capacity of the water to abstract caloric from the tissues so as to maintain its own fluidity, the water of the tissues of the cholera patient would fall so rapidly that death would almost be instantaneous on the destruction of the homogeneousness of the blood."

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3. *A System of Perivascular Canals in the Central Nervous Organs.*—The last number of the *Archives des Sciences* contains a notice of Herr HIS's dis-

covery of a peculiar series of channels which traverse the central nervous masses. He first detected them in a number of sections of the spinal cord, in which they were represented by grooves which he looked upon as opened channels. They are more distinct in the gray than in the white substance. Each groove incloses a bloodvessel, which either lies freely within it or is attached to its walls. They are abundant enough in the brain, and this circumstance explains how one is enabled to remove whole vascular networks with the forceps from the surface of the cerebrum. Herr His's injections of these spaces show the perivascular canals to lie between the nervous substance and the pia mater. He concludes that the spaces are connected with the lymphatic system, and thinks them analogous to those reservoirs which in the frog are placed between the integument and the muscles, and which almost completely separate one from the other.—*Lancet*, June 9, 1866.

4. *Termination of the Motor Nerves in the Muscles.*—The views of Dr. Beale, relative to the termination of the nerves in the muscular tissue have been pretty generally accepted in Great Britian. Most British microscopists hold with the King's College Professor in believing that the nerves have no decided termination in the muscles, but that their ultimate fibres unite in forming a network of extreme delicacy. Abroad, however, this view has met with some opposition, and especially from MM. Kuhne and Rouget, the latter of whom has just presented a memoir to the Academy of Sciences upon the above subject. M. Rouget states that the nerve-fibre ends in a sort of terminal *plate* or disk; and in answer to Dr. Beale's denial of such a mode of termination he writes: "I shall only reply, that all other observers who have devoted themselves to this subject, MM. Krause, Kühne, Waldeyer, Engelmann, and Letzerich, and still more recently, MM. Conheim and Vulpian, have all admitted the existence of the terminal plate, and its entire independence of any nervous network." M. Rouget laid before the members of the Academy some photographs of microscopic preparations of tissue, which he said demonstrated the following conclusions: (1) The terminal division of the *axis cylinder* of the motor nerve-fibre constitutes by anastomosis and fusion a terminal expansion of finely granular substance identical with that of the terminal filaments of the corpuscles of Pacini, of the ultimate nervous lamina of electric plates of fishes, &c., and in immediate contact with the contractile substance of the primitive bundle. (2) This nervous expansion is traversed in every direction by minute canals, establishing a connection between the numerous nuclei of the *plate*, and communicating probably, on the one hand, with the space intermediate between the sarcolemma and the contractile fibrillæ, and on the other hand, with the interstice between the matrix of the nervous tube and the medullary layer—an arrangement which is doubtless related to the special action of certain poisonous substances upon the terminal extremity of the motor nerves of animal life. M. Rouget's paper will be found in the *Comptes Rendus*, June 25th.—*Lancet*, July 21, 1866.

5. *Vessels and Nerves of the Ligaments and Fibro-Cartilages.*—M. Sappey, in a memoir presented to the Imperial Academy of Sciences, describes the vascular and nervous parts of the ligaments and cartilages. He says of the inter-articular cartilages, those of the knee are the most abundantly supplied with nerves and vessels. The vessels run at first nearly parallel with the connective-tissue fibres; but soon they divide and subdivide and anastomose, so as to form the most exquisite reticulations, which terminate in elegant festoons. The veins follow the course of the arteries. In the fibro-cartilages of the joints the vessels pass from the periphery towards the centre; but they penetrate only to a depth of three or four millimetres. The periarticular fibro-cartilages, or *bursæ*, are still more vascular. Both these sets of tissues receive numerous nerves, which sometimes lie with the vessels, and at others pursue an independent course. The ligaments are also well supplied with vessels and nerves, especially the latter, which are more numerous than those of the skin. In the tendons the supply of nerves and vessels is less marked. As regards their nervous and vascular supplies, the tissues described in M. Sappey's memoir follow this order: (1) The

ligaments and periarticular fibro-cartilages; (2) the tendons and aponeuroses; and (3) the interarticular fibro-cartilages.—*Lancet*, July 7, 1866.

6. *Myograph.*—M. MAREY, the inventor of the sphygmograph, has devised a new instrument which he names the myograph, for determining the vibrations of muscular fibres. It is employed only in connection with the muscles of animal life, and it records graphically the vibrations of these just as the sphygmograph records pulsations. The vibrations of the fibres of muscles have already been determined by Haughton, Helmholtz, and others; but M. Marey has gone further, and, by introducing the method of autographic registration, has shown the exact nature of the influence of fatigue and disease (muscular and nervous) over these vibrations. The myograph consists of a sort of forceps, which embrace the limb experimented on, and one of whose arms rests upon the muscle whose vibrations are to be determined. This is the only movable limb of the forceps, and it is, therefore, thrown into vibrations during the contraction of the muscle. The forceps are connected with the wire of a galvanic battery, and by this means the muscle is at pleasure thrown into action. The remainder of the myograph is upon the plan of the sphygmograph, and comprises a system of levers and drums, on which the register of the vibrations is traced.—*Lancet*, July 7, 1866.

7. *Influence of Water in the Production of Milk.*—The recent experiments of M. DAMOISEAU and others, show that the abundant secretion of milk is directly dependent on the abundant ingestion of water. In former researches, which tended to prove the opposite conclusion, there was not sufficient allowance made for the quantity of water contained in the food given to the cows upon which the experiments were conducted.—*Lancet*, June 9, 1866.

8. *Structure of the Crystalline Lens.*—A very valuable paper has been published by HERR VON BECKER in the *Archiv für Opthalmologie* on the subject of the structure of the crystalline lens. The eyes he investigated were those of the calf. They were prepared by maceration for a few hours in a solution of sulphuric acid (five drops to the ounce of distilled water). The capsule of the lens, he says, at first appears to be perfectly homogeneous, but when it is examined with a sufficiently high power, it exhibits striæ that indicate a lamellar structure, which is still more marked when the capsule has undergone morbid thickening. The anterior capsule is decidedly thicker than the other. In fish and in amphibia there is less difference between the two capsules in this respect than in mammalia and birds. The difference increases with age. In a man of seventy-two years it amounted to 0.047 millimetres. The inner surface of the thickened portion of the capsule is clothed with a layer of cells, which is not epithelial only, but is in some measure composed of small rounded cells. The fibres of the lens are thus developed: The small rounded cells of the capsule arrange themselves in groups of from two to six; their nuclei increase in size, assume a linear direction, and finally the cells themselves unite, and form cylinders of a concave and jointed appearance at the surface of the lens. The development goes on actively even at birth. Numerous spaces exist between the fibres, to which Herr Becker gives the name of *interfibrillary spaces*, and asks, do they exist during life?—*Lancet*, June 9, 1866.

MATERIA MEDICA AND PHARMACY.

9. *Action of the Bromide of Potassium upon the Nervous System.*—Dr. J. CRICHTON BROWNE has subjected forty-three patients suffering from various affections of the nervous system to the action of the bromide of potassium, and from watching its effects on these patients and comparing them with the recorded experience of others, he has become convinced of its high value. He has been